

Metadata Guide

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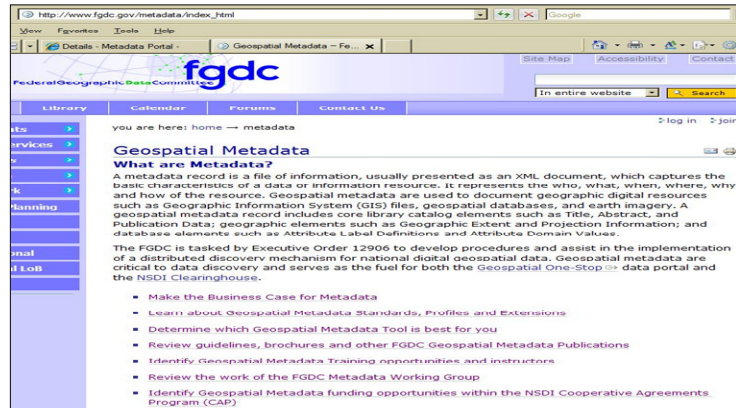
Metadata

1. What is it?
2. How do you make it?
3. What should be in it?
4. What HAS to be in it for the Portal?
5. How does the Portal use it to classify and find your data?

What is Metadata?

"Data about Data"

<http://www.fgdc.gov/metadata>



Metadata is "data about data". For GIS data, there are two standards that you may follow that tell you what should be in your metadata. One is called the Content Standard for Digital Geospatial Metadata (CSDGM) from the Federal Geographic Data Committee (FGDC), and the other is from the International Standards Organization (ISO). I am only familiar enough with the ISO standard to know that it seems to be much harder to work with than the FGDC standard. I think the Portal can work with the ISO standard, but if you choose to use it, I won't be able to help you with it.

Slide 4

What is Metadata?

Publisher's Guide

Montanans need one place where they can search for GIS data about the state. The Montana GIS Portal is that place. When you publish your metadata on the Montana GIS Portal, including how users can obtain your data or live map service, you benefit state and national GIS efforts through data sharing. You also reduce your workday interruptions from data requests and inquiries about your data.

All metadata published on the Montana GIS Portal is also published on the federal government's Geospatial One-Stop portal. If you have data you want to share, but do not have a web site to share it from, the Montana State Library may be able to help. For more information, email the Portal Administrator: gisportal@mt.gov.

Each of the following metadata publishing processes is explained on the remainder of this page. These procedures assume you use ArcCatalog to manage your metadata. To publish metadata on the Montana GIS Portal:

- Write Metadata for your Data.
- Register as a Montana GIS Portal Publisher.
- Upload your Metadata to the Portal.

Write Metadata for your Data

Effective data sharing is nearly impossible without basic metadata. The Montana State Library can assist you with writing metadata and establish metadata workflows for your data. Refer to the Montana GIS contact the Portal Administrator: gisportal@mt.gov. Metadata published to the Montana GIS Portal must which is built upon the Federal Geographic Data Committee's (FGDC) standard for Digital Geospatial Metadata (CSDGM), version 2.0. [See the Montana GIS Portal](#) for more information.

The screenshot shows the Montana GIS Portal homepage. A red arrow points from the 'Write Metadata for your Data' section to the 'Find Data You Need' search bar. Another red arrow points from the 'Publisher's Guide' section to the 'Publish Data You Have' section. A red circle highlights the 'Publisher's Guide' link in the top right corner. A red circle highlights the 'Metadata Writing Guide' link in the top right corner. A red circle highlights the 'Portal Metadata Standard' link in the top right corner.

Metadata Standard for the Montana GIS Portal

Introduction
This is a standard for metadata documents submitted for publication on the Montana GIS Portal at <http://data.mt.gov>. The GIS Portal is a central location for the discovery of Geographic Information System data about Montana, and it provides a map viewer that allows anyone to view GIS data sets that are available through web services.

Metadata is data about data. In the context of the GIS Portal, a metadata document is an XML file that contains descriptive information about a GIS data set. The XML file must conform to a standard that allows the portal software to load it into a searchable index, provide basic descriptive information about the data set, and provide information that allows users to retrieve the data set.

The standard's requirements are divided into different levels of compliance, according to whether they are mandatory technical requirements necessary for the correct operation of the portal software, mandatory informational content to ensure minimal necessary information for the evaluation, retrieval, and use of the data set by portal users, and recommended content that allows users to fully understand the data.

Mandatory Technical Requirements

- **FGDC Compliance**
Metadata documents submitted to the portal must be valid XML documents that conform to the structure set out in the Federal Geographic Data Committee's (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM), version 2.0.

The GIS portal has links to more information about metadata and how to publish your metadata on the Portal.

What is Metadata?

Metadata for Montana Names from the Geographic Names Information System

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification Information:

Citation:

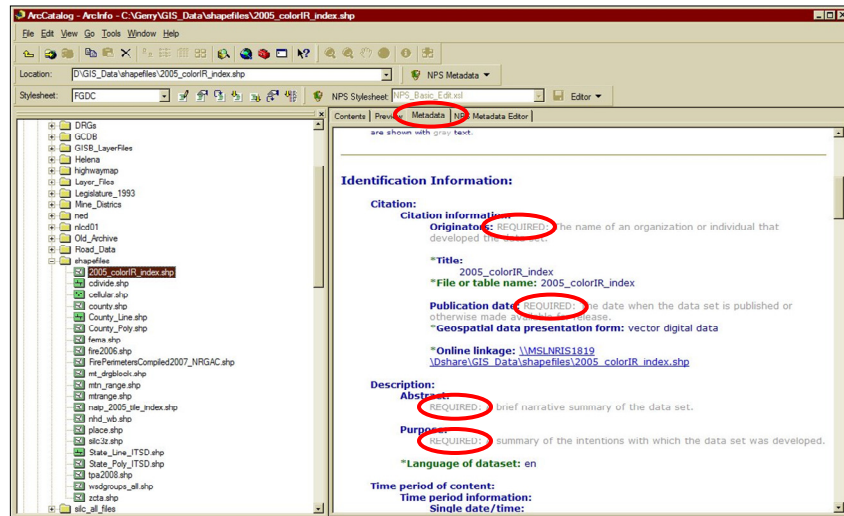
Originator: U.S. Geological Survey
Publication date: 03/24/2008
Title: Montana Names from the Geographic Names Information System
Publication place: Helena, MT
Publisher: Montana State Library
Online linkage: <http://nris.mt.gov/nsdi/nris/shape/gnis.zip>

Abstract:

The Geographic Names Information System holds the Federally recognized name of and a location for physical and cultural geographic features of all types in the United States, current and historical, but not including roads and highways. The database assigns a unique, permanent feature identifier as a standard Federal key for accessing, integrating, or reconciling feature data from multiple data sets. The GNIS collects data from a broad program of partnerships with Federal, State, and local government agencies and other authorized contributors. The GNIS provides data to all levels of government and to the public, as well as to numerous applications through a web query site, web map and feature services, file download services, and customized files upon request.

Slide 6

How Do You Make Metadata?

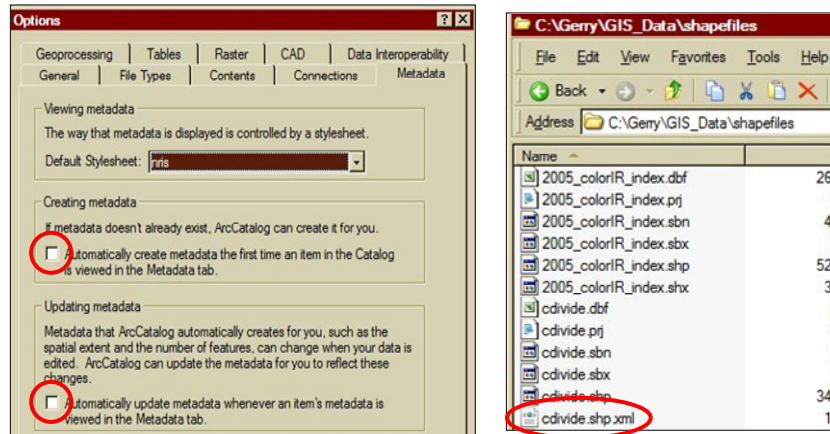


The only metadata tool I am familiar with and can discuss is ESRI's ArcCatalog. The FGDC metadata web page has links to other tools that can help you make FGDC metadata.

You really need a tool that can read metadata in plain language and transform it into XML format. Metadata uploaded to the Portal must be in XML format.

ArcCatalog by default automatically makes a metadata file for any data you click on when the metadata tab is selected. This automatically creates scores of notations about what ArcCatalog thinks is required in your metadata that you have to track down and fix. It is much easier to create metadata if you set ArcCatalog to not do this (see next slide).

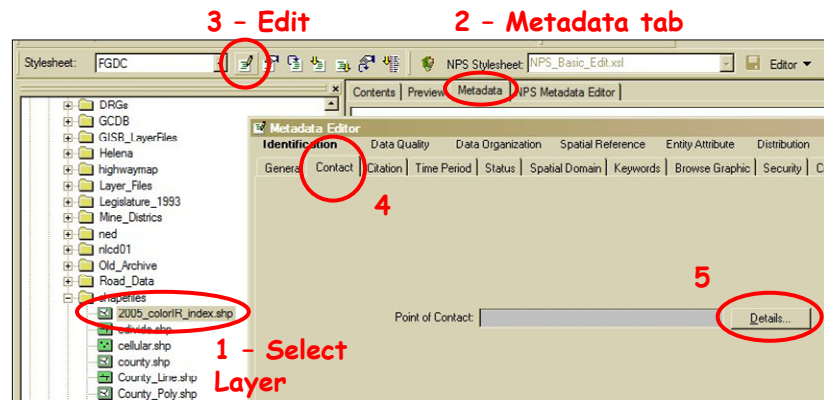
Take Control of Your Metadata



In ArcCatalog, select Tools from the main menu and then select Options. Turn off BOTH of the checkboxes, so that ArcCatalog never messes with your metadata unless you want it to.

ArcCatalog stores metadata for shapefiles on disk with the shapefile as a ".shp.xml" file. Metadata for geodatabase layers is stored in tables where it is not easily accessible without ArcCatalog.

Make a Metadata Template



Metadata contains a lot of information about you and your organization. It is easier to make metadata for a layer if you can start by loading an empty metadata record that has your contact information in it.

The next couple of slides guide you through the process of finding the parts of a metadata record that you probably will want to re-use and filling them out.

Click the Edit button while looking at a layer that has no metadata, to start an empty record.

The first place to enter your basic info is the Contact tab. Click it, then click the Details button.

Make a Metadata Template

The image displays two screenshots of a 'Contact Information' form. The left screenshot shows the 'General' tab with the 'Address' sub-tab selected and circled in red. The right screenshot shows the 'Address' sub-tab selected and circled in red, displaying fields for contact voice, fax, email, and TDD/TTY.

Contact Information (Left Screenshot):

- Primary Contact: ☒ Person ☐ Organization
- Person: Gerry Daumiller
- Organization: Montana State Library
- Position: NRIS Manager
- General: **Address** (circled in red)
- Address Type: mailing address
- Address: PO Box 201800
- City: Helena
- State or Province: MT
- Postal Code: 59620-1800
- Country:

Contact Information (Right Screenshot):

- Primary Contact: ☒ Person ☐ Organization
- Person: Gerry Daumiller
- Organization: Montana State Library
- Position: NRIS Manager
- General: **Address** (circled in red)
- Contact Voice Telephone: 406-444-5355
- Contact Fax Number:
- Contact Email Address: gdaumiller@mt.gov
- Contact TDD/TTY Telephone:
- Hours of Service:
- Contact Instruction:

There are two tabs to fill out on the Contact Information window. Notice that you can have more than one Address, telephone number, and Email address. The metadata standard was created before anyone had cell phones, so there isn't a separate field for it.

Make a Metadata Template

The screenshot shows the 'Metadata Editor' application with the 'Distribution' tab selected. The interface includes several tabs: Identification, Data Quality, Data Organization, Spatial Reference, Entity Attribute, Distribution, and Metadata Reference. The 'Distribution' tab contains a 'Resource Description' field with the text 'Downloadable Data', a 'Distribution Liability' field with a disclaimer, and a 'Distributor' field with a 'Details...' button. A 'Contact Information' dialog box is also visible, showing fields for Primary Contact, Address, City, State or Province, Postal Code, and Country.

The Distribution section is where you put your standard liability statement, and it has a contact section that you fill out the same way you did with the Point of Contact. In a large organization, these could be different people, and each person might want their own metadata template.

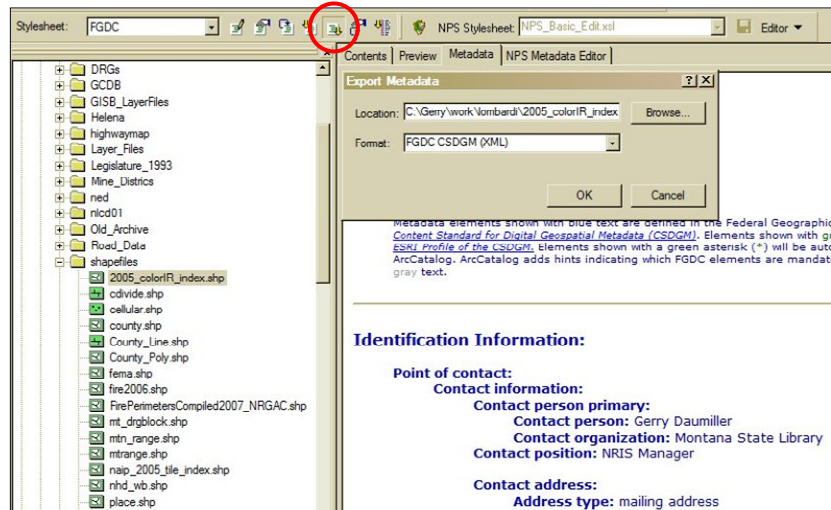
THE RESOURCE DESCRIPTION IS WHERE YOU TELL THE PORTAL WHAT TYPE OF RESOURCE THIS IS, such as downloadable data, live data, or a mapping application. Use one of the choices given later in this presentation. You can put the value you will use for most of your metadata here, but if you have different types of resources available, this is an important field to think about for each document.

Make a Metadata Template

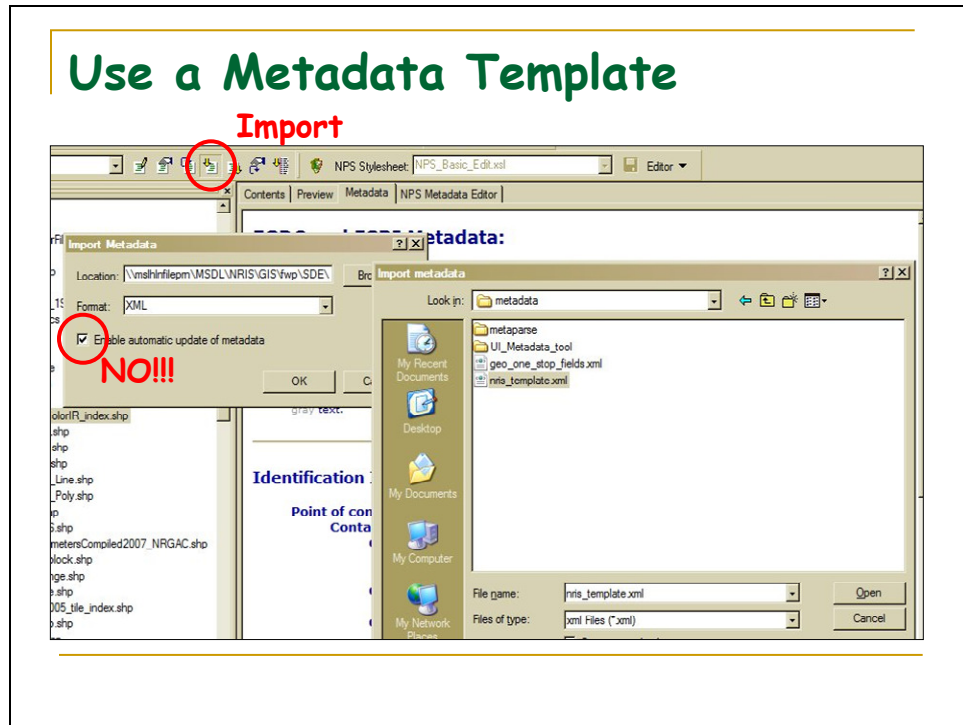
The screenshot shows the 'Metadata Editor' application window. The 'Metadata Reference' tab is selected and highlighted with a red circle and the number 1. Within this tab, the 'Contact' field is highlighted with a red circle and the number 2, and a 'Details...' button is also circled in red with the number 2. To the right, a 'Contact Information' dialog box is open, with the 'Person' radio button selected and highlighted with a red circle and the number 3. The dialog shows contact details for 'Gerry Daumiller' at 'Montana State Library'. At the bottom of the main window, the 'Save' button is circled in red with the number 4. The interface includes various input fields for metadata dates, standards, and security information.

The Metadata Reference section tells who wrote the metadata and when. The Contact section has the same format as the Point of Contact and the Distributor.

Export your Metadata Template



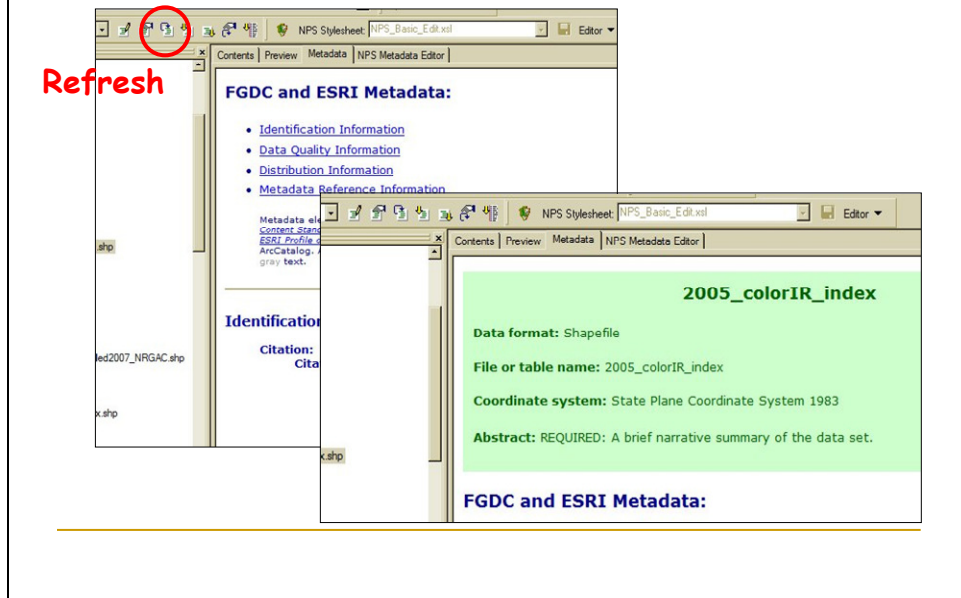
After you save your work on your template, export it to FGDC XML format.



Now you can go to a layer you want to make metadata for and import the template file you saved.

I always turn off the "Enable automatic update of metadata". This messes up the title of your metadata document if you are importing a template that already has a title.

Use a Metadata Template



AFTER you have imported your template, click on the Create/Update metadata button, and it will fill out lots of stuff about your layer automatically – geographic extent, number of features, coordinate system, and a list of the attribute fields.

When you do this ArcCatalog will still make a bunch of entries in the metadata saying what you are required to fill out, but there are a lot fewer of them to track down than if you hadn't used the template.

What Should Be In a Metadata Document?

Citation:
Originator: Montana State Library
Publication date: 06/03/2004
Title: Montana Elementary School District Boundaries, 2004
Publication place: Helena, Montana
Publisher: Montana State Library
Online linkage: <http://nms.mt.gov/nsd/nrs/a00/elschd2004.zip>
Online linkage: <http://nms.mt.gov/nsd/nrs/shape/elschd2004.zip>

Abstract:
This data is a revised version of the Elementary School Districts from the U.S. Census Bureau 2000 Redistricting TIGER files. The boundaries of districts in Missoula County have been replaced by data provided by the Missoula County Surveyor's Office.

The data includes the number of students enrolled in each district at the beginning of the 2000 school year. In the e00 (Arc/Info coverage) version of the data, each district has its name labeled by annotation level 1 and its enrollment labeled by annotation level 2.

Since this data was created, the Kessler district was absorbed by the Helena district. The Bridge, Billup, Belle Creek, Lloyd, Malmberg, and Musselshell districts are not currently operating. The Squirrel Creek district has changed its name to Spring Creek.
Purpose: Display or analysis of school districts
Time period of content:
Calendar date: 2000
Currentness reference: publication date
Status:
Progress: Complete
Maintenance and update frequency:
The Census Bureau releases updates to the TIGER files annually. The State Library will probably not update the school district boundaries before 2011 unless a need for it is identified.
Access constraints: None
Use constraints: Not for use at scales greater than 1/100,000.
Point of contact:
Montana State Library
P.O. Box 201800
Helena, Montana 59620-1800

Telephone: (406) 444-5358
Fax: (406) 444-0581
E-Mail: nrs@mt.gov

Originator: Who made this data set? In this example, a good case could be made for saying US Census Bureau instead of State Library, since most of it came from there.

Title: WHERE, WHAT, and WHEN

Publication Date: Required by the Portal.

Publisher: Who is responsible for distributing it? For this data, it is really the State Library rather than the Census Bureau, because of the work we did on it that you can't get from them. If you can get almost exactly the same data from the Census Bureau, I still suggest putting your organization here, since you are who people will be getting it from.

Online linkage: The Portal has rules, described later, for how this should be filled out for different data types.

Purpose: This can be a general purpose statement of what the data is good for, or your specific purpose for creating the data, such as "This was created so that we could make a school district map with student enrollment for the Office of Public Instruction."

The Point of Contact must be filled out for the Portal to accept the metadata.

What Should Be In a Metadata Document?

Keywords:

Theme:

Theme keywords: Hydrography, Stream, River, Lake, Pond, Canal, Ditch, Reservoir, Spring, Seep, Swamp, Marsh, Artificial Path, Reach

Theme keyword thesaurus: None

Theme:

Theme keywords: inlandWaters

Theme keyword thesaurus: ISO 19115 Topic Category

Place:

Place keywords: Montana

The screenshot shows a metadata editor window titled "Editing 'National Hydrography Dataset Waterbody Features'". The "Keywords" tab is active. The "Theme" section has a "Keyword" field with "inlandWaters" and a "Thesaurus" field with "ISO 19115 Topic Category" (circled in red). The "Place" section has a "Keyword" field with "Montana" and an empty "Thesaurus" field.

Theme Keywords: For the Portal, there MUST be a Theme section with a Theme keyword thesaurus whose value is “ISO 19115 Topic Category”. You must choose at least one keyword from the following list:

The 19 Theme Keywords

ISO 19115 Topic Category

001	farming	
002	biota	
003	boundaries	
004	climatologyMeteorologyAtmosphere	
005	economy	
006	elevation	011 intelligenceMilitary
007	environment	012 inlandWaters
008	geoscientificInformation	013 location
009	health	014 oceans
010	imageryBaseMapsEarthCover	015 planningCadastre
		016 society
		017 structure
		018 transportation
		019 utilitiesCommunication

Theme Keywords: For the Portal, there MUST be a Theme section with a Theme keyword thesaurus whose value is "ISO 19115 Topic Category". You must choose at least one keyword from the following list:

What Should Be In a Metadata Document?

Source information:
Originator: U.S. Census Bureau
Publication date: 2000
Title: 2000 Tiger/Line Files
Edition: 2000 Redistricting
Publication place: Washington, DC
Publisher: U.S. Census Bureau
Source scale denominator: 100000
Source contribution:
The school district boundary coordinates, except for those within Missoula County, and school district names were selected and copied from the TIGER files.
Calendar date: 2000

Source information:
Originator: Missoula County Surveyor's Office
Publication date: Unpublished Material
Title: Missoula County Elementary School District Boundaries
Source scale denominator: 24000
Source contribution:
The school district boundary coordinates within Missoula County were copied from this source.
Calendar date: 2004

Source information:
Originator: Montana Office of Public Instruction
Publication date: 2000
Title: Fall 2000 Enrollment
Publication place: Helena, MT
Publisher: Montana Office of Public Instruction
Source contribution: The 2000 Enrollment data was copied from this source.
Calendar date: 08/2000

Process step:
The TIGER/line files were imported into a series of ArcView shapefiles using TGR2SHP version 4.1 by GIS Tools of Knoxville, TN. This step produced shapefiles for each county of elementary school districts and unified school districts.
Process date: 2001

Process step:
The individual county unified and elementary school district shape files were projected to Montana State Plane Coordinates and combined into a single data set.
Process date: 2001

Process step: The fall enrollment data was joined to the attribute table.
Process date: 2001

Process step:
Boundary lines from the Missoula County data were incorporated into the data set
Process date: 06/03/2004

Sources and Processing.

What material was assembled to create this data set? How did you do it?

What Should Be In a Metadata Document?

Entity and Attribute Information:

Attribute label: Shape

Attribute definition: Feature geometry.

Attribute label: GNIS_ID

Attribute definition:

This is the unique Feature_ID assigned to the feature by the GNIS. This copy of the GNIS has eight features with GNIS-IDs between 0 and 7 that were added by the State Library and do not have official GNIS feature IDs yet.

Attribute label: Name

Attribute definition:

Official Feature Name. If a feature has a 1 in the ten millions column of the Change_Log field, the name was edited by the State Library.

Attribute label: Class

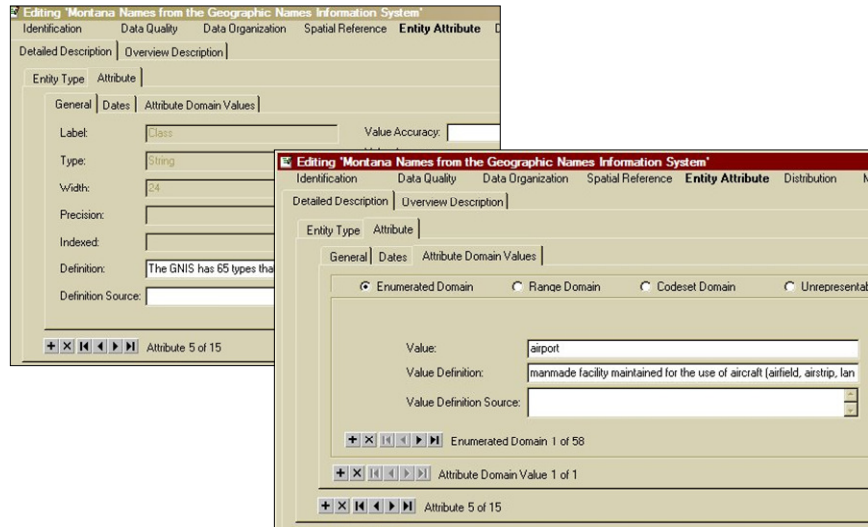
Attribute definition:

The GNIS has 65 types that a feature may be classified as. 58 of these classes occur in this file for Montana. If a feature has a 1 in the hundreds column of the Change_Log field, the feature has been reclassified at the State Library.

Attribute Value	Definition of Attribute Value
airport	manmade facility maintained for the use of aircraft (airfield, airstrip, landing field, landing strip)
arch	natural arch-like opening in a rock mass (bridge, natural bridge, sea arch)
area	any one of several areally extensive natural features not included in other categories (badlands, barren, delta, fan, garden)

Attribute list and explanations. ArcCatalog makes the list for you, but you should include an explanation of what they all mean.

Working With Attributes in ArcCatalog



If an attribute has a limited list of values that are allowed in it, you should use the Enumerated Domain to make a list of them and what they mean.

It can be really helpful to type some of this stuff in a text editor ahead of time and copy and paste it into the little ArcCatalog fields.

What Should Be In a Metadata Document?

Distributor:

Montana State Library
PO Box 201800
Helena, MT 59620-1800

Telephone: 406-444-5358
E-Mail: nris@mt.gov

Resource description: Downloadable Data

Distribution liability:

Although these data have processed successfully on a computer system at the City of Helena, no warranty expressed or implied is made regarding the purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly recommended that careful attention be paid to the contents of the metadata file associated with these data. The City of Helena and the Montana State Library shall not be held liable for improper or incorrect use of the data described and/or contained herein.

Standard order process:

Digital form:

Format name: MrSID

Online option: http://nris.mt.gov/nsdi/orthophotos/2006_helena.html

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Metadata Reference Information:

Metadata date: 06/11/2007

Metadata contact:

City of Helena
316 N. Park Ave.
Helena, Montana 59624

Distributor: Who can I get the data from? This is required by the Portal

Resource Description: Must be one of the data types shown on the next slide.

Standard Order Process: Not required, but nice to have.

Metadata Contact Address: required for the Portal.

Resource Description

1. **Live Data and Maps:** Web services that may be added to map applications.
2. **Downloadable Data:** Data files which may be downloaded and then added to a map.
3. **Offline Data:** Data files that you have to order.
4. **Static Map Images:** Map images that may be downloaded
5. Document
6. Applications
7. Geographic Services
8. Clearinghouse
9. Map Files
10. Geographic Activities

The Resource Description in the Distribution Information must be filled out with one of the values shown.

Make a Link to Your Data

1

2

3

The screenshot shows a web-based form titled "Editing: Montana Public Land Ownership". The form has several tabs: Identification, Data Quality, Data Organization, Spatial Reference, Entity Attribute, and Distribution. The "Identification" tab is active, and within it, the "Citation" sub-tab is selected. The "Citation Title" field is filled with "Montana Public Land Ownership". Below this, the "Citation Information" section is expanded, showing fields for Title, Originator, Publication Date, Publication Time, Edition, Geospatial Data Presentation Form, and Online Linkage. The "Online Linkage" field is highlighted with a red circle and labeled with a red "3". The "Online Linkage" field contains the URL "http://nris.mt.gov/nrsd/nris/mdb/stewardship.zip".

Citation Title: Montana Public Land Ownership Details...

Citation Information

General Series/Publication Information

Title: Montana Public Land Ownership

Originator: Montana Natural Heritage Program (MTNHP)

Publication Date: 20070117

Publication Time:

Edition:

Geospatial Data Presentation Form: Vector digital data

Online Linkage: <http://nris.mt.gov/nrsd/nris/mdb/stewardship.zip>

Online Linkage Rules

Live Data and Maps

- **ArcIMS:** `http://<server>/image/<service>`
 - `http://maps.nris.mt.gov/image/raster_svc`
- **OGC Map Service:** (4 types)
 - `http://<server>/<servlet-path>/com.esri.wms.Esrimap`
 - `http://<server>/<OGC Type>/<path>`
 - OGC Type is **wfs**, **wms**, or **wcs**
 - `http://<server>/<path>/service=<OGC Type>`
 - `http://<server>/<path>/<text>request=getmap<text>`
 - `http://maps.mt.com/OGCservlet/OGC?ServiceName=MTmaps&request=getmap&Layers=State`

If the Resource Description is Live Data and Maps and the Online Linkage follows these rules, the Portal will make a button for adding the service to the Map Viewer.

Online Linkage Rules

Downloadable Data

`http://<server>/<path>/<filename>.<extension>`

or

`ftp://<server>/<path>/<filename>.<extension>`

Extensions: zip gz tar tgz dbf shp rar xls txt dwg dxf
dgn e00

If the Resource Description is Downloadable Data and the Online Linkage follows these rules, the Portal will make a button for downloading the data.

Online Linkage Rules

Static Map Images

`http://<server>/<path>/<filename>.<extension>`

or

`ftp://<server>/<path>/<filename>.<extension>`

Extensions: gif jpg jpeg bmp pdf pmt tif tiff cal pct pict
eps mxd av mpg mpeg wmv img rm

For all other Online Linkage/Resource Description combinations, the Portal will make a "Go to website" button for the link.

If the Resource Description is Live Data and Maps and the Online Linkage follows these rules, the Portal will make a button for downloading the map.